FIG. 1

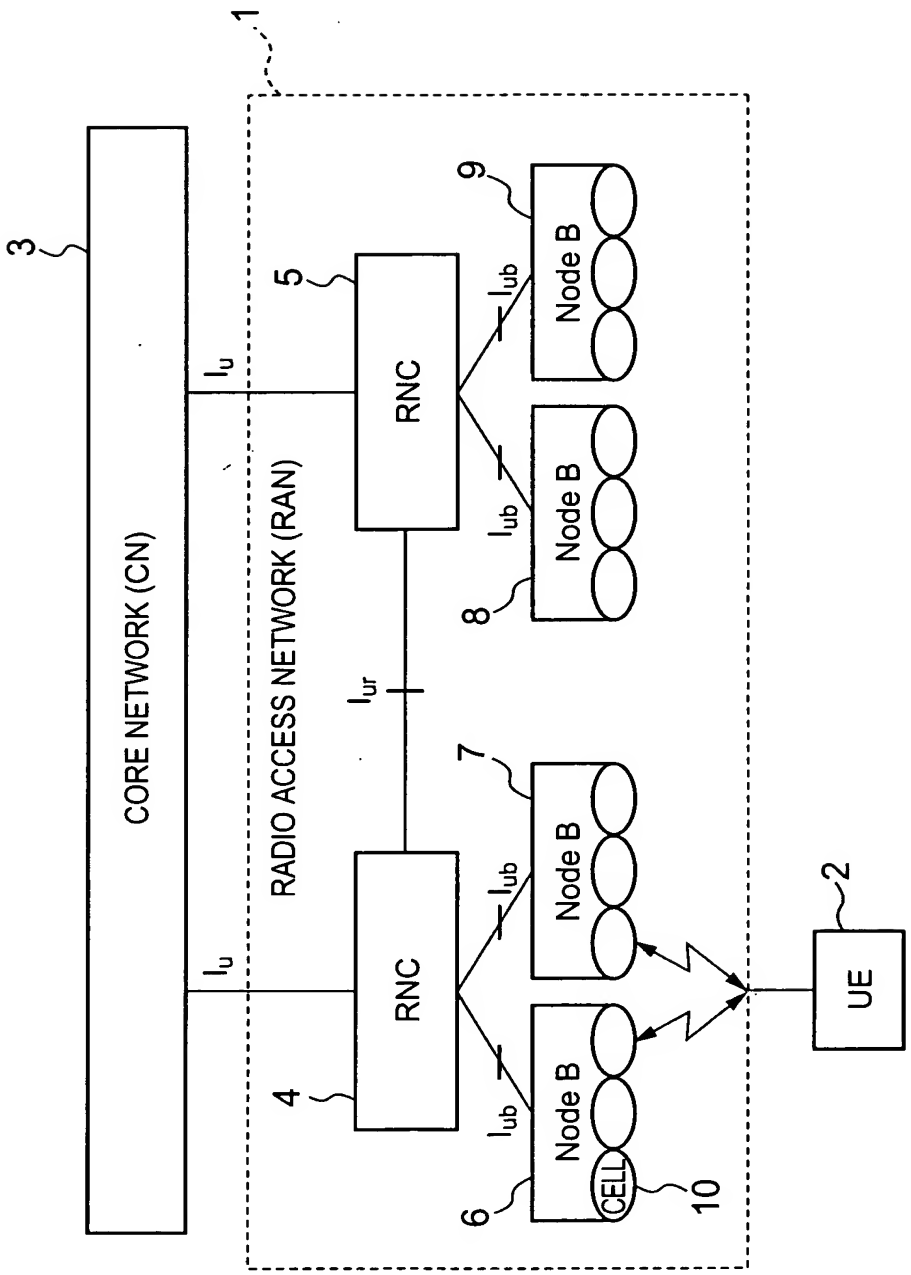

1
3
CORE NETWORK (CN)
RADIO ACCESS NETWORK (RAN)
I_u
I_u
5
RNC
4
RNC
I_{ur}
I_{ub}
I_{ub}
I_{ub}
I_{ub}
9
Node B
8
Node B
7
Node B
6
Node B
CELL
10
2
UE

FIG. 2

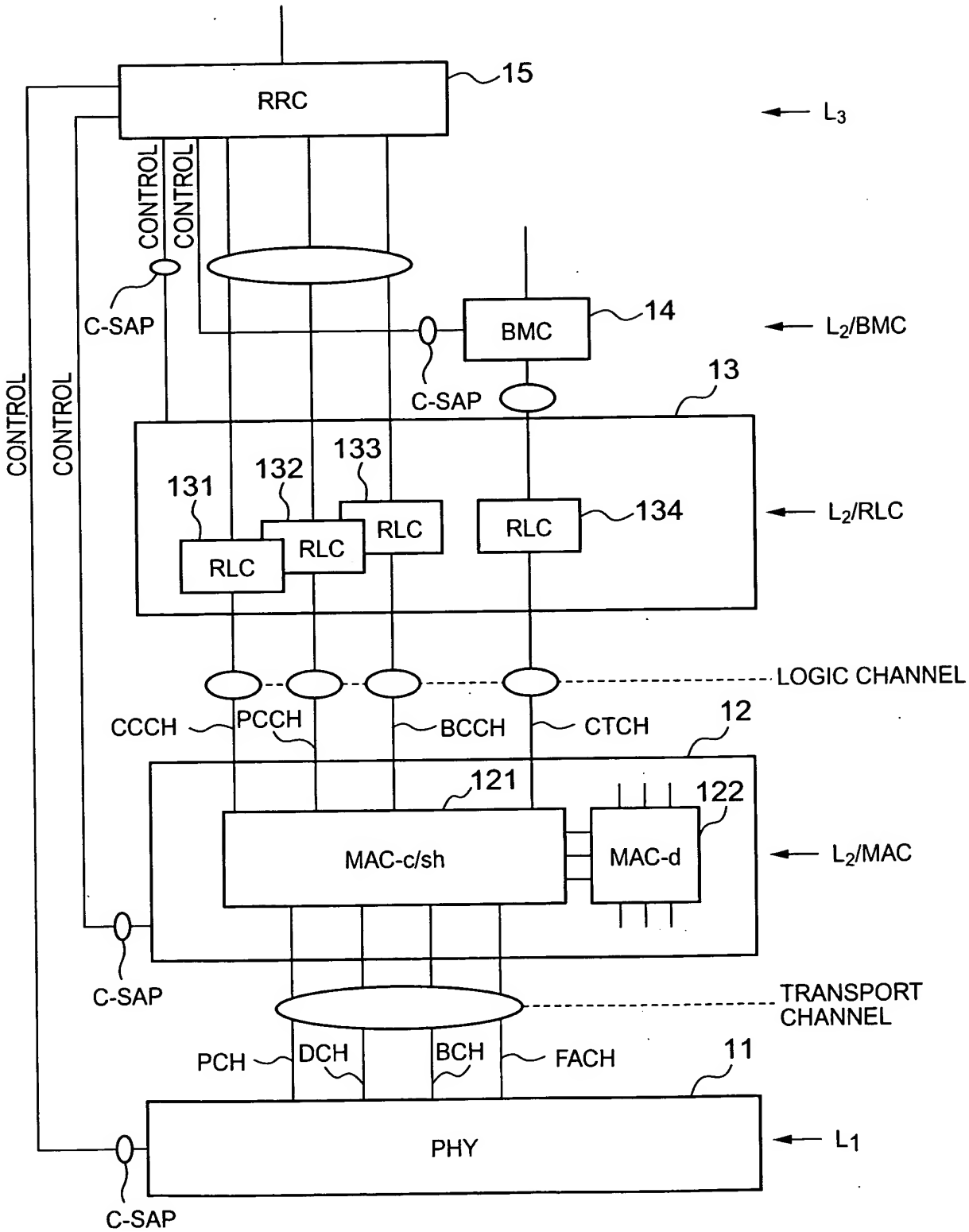

RRC
15
L_3
CONTROL
CONTROL
C-SAP
BMC
14
L_2/BMC
C-SAP
13
CONTROL
CONTROL
131
132
133
RLC
RLC
RLC
RLC
134
L_2/RLC
LOGIC CHANNEL
CCCH
PCCH
BCCH
CTCH
12
121
122
MAC-c/sh
MAC-d
L_2/MAC
C-SAP
TRANSPORT CHANNEL
PCH
DCH
BCH
FACH
11
PHY
L_1
C-SAP

FIG. 3

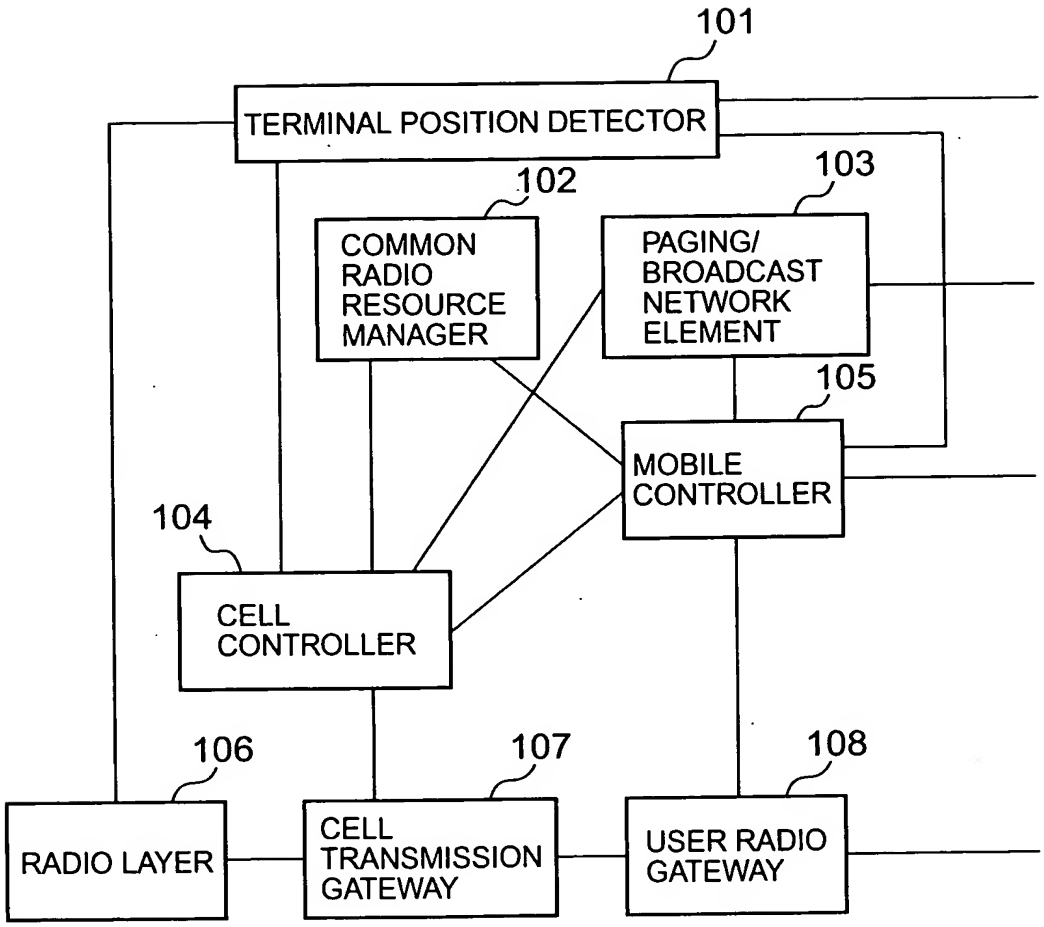

101
TERMINAL POSITION DETECTOR
102
COMMON RADIO RESOURCE MANAGER
103
PAGING/ BROADCAST NETWORK ELEMENT
105
MOBILE CONTROLLER
104
CELL CONTROLLER
106
RADIO LAYER
107
CELL TRANSMISSION GATEWAY
108
USER RADIO GATEWAY

FIG. 4

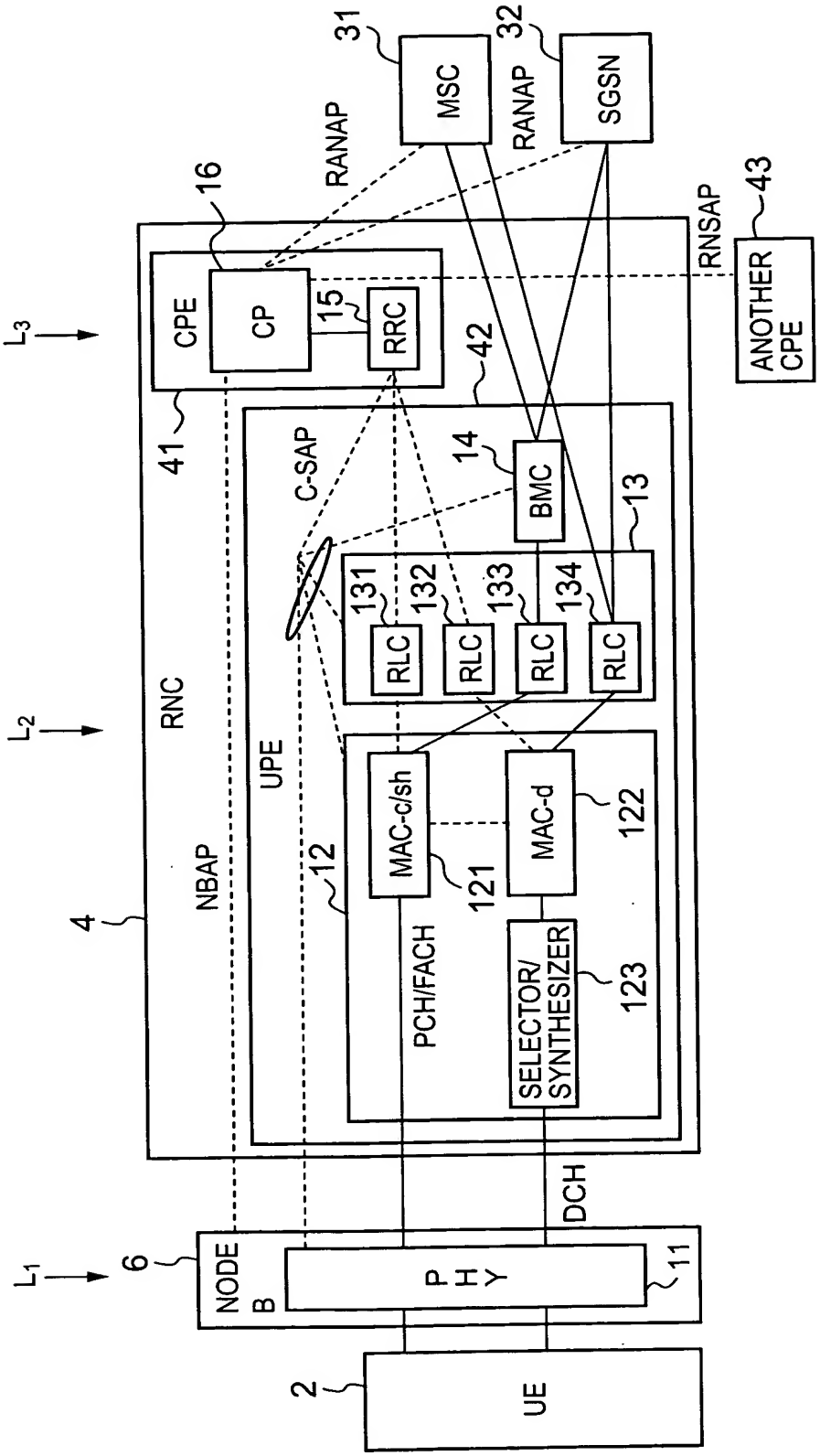

L3
L2
L1
RNC
UPE
NBAP
4
CPE
CP
RRC
15
16
41
42
C-SAP
BMC
14
13
RLC
131
132
133
134
MAC-c/sh
121
MAC-d
122
12
PCH/FACH
SELECTOR/
SYNTHESIZER
123
DCH
NODE
B
6
PHY
11
UE
2
MSC
31
SGSN
32
RANAP
RANAP
RNSAP
43
ANOTHER
CPE

FIG. 5

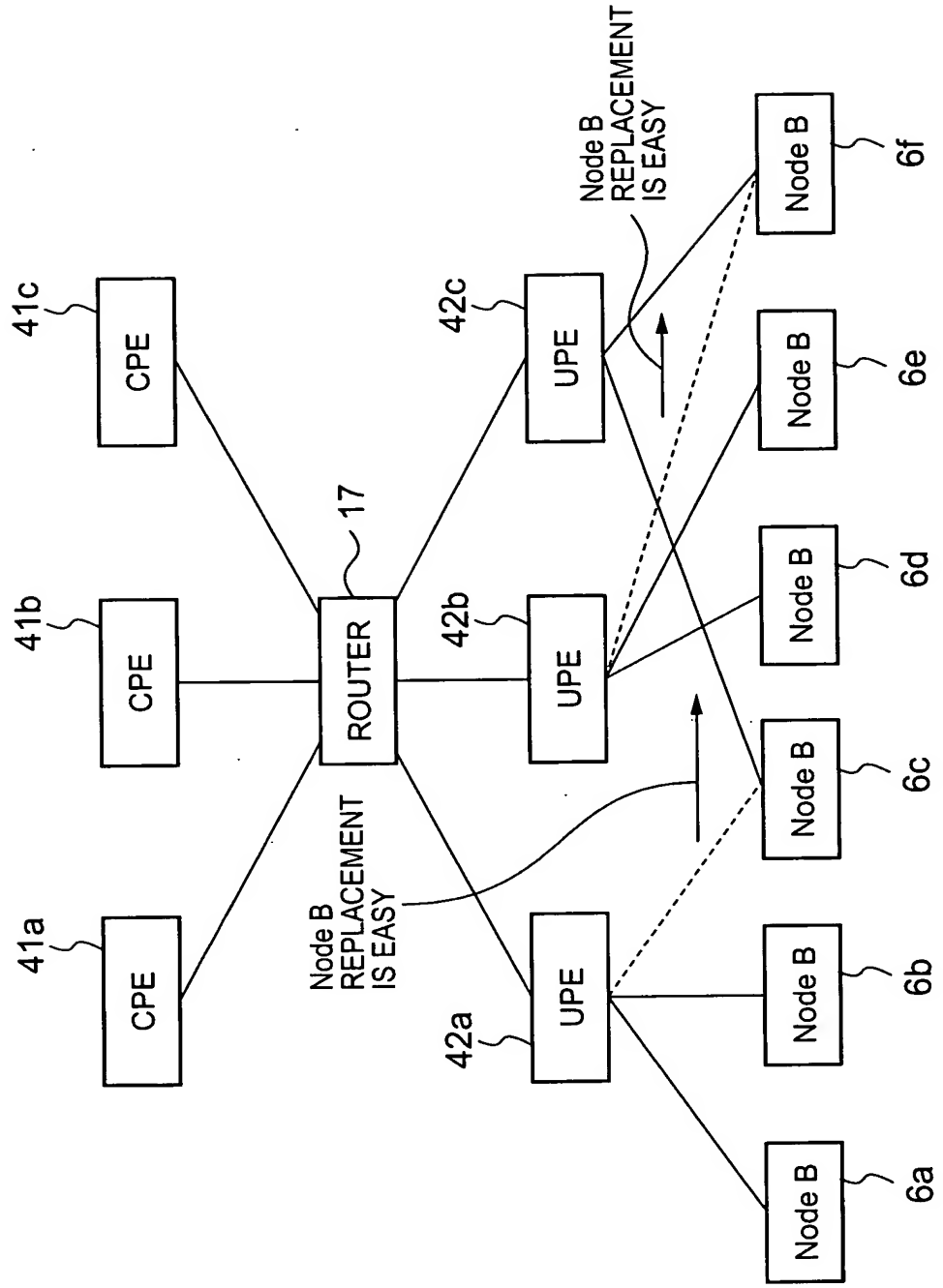

41c
CPE
41b
CPE
41a
CPE
17
ROUTER
42c
UPE
42b
UPE
42a
UPE
Node B REPLACEMENT IS EASY
Node B REPLACEMENT IS EASY
Node B
6f
Node B
6e
Node B
6d
Node B
6c
Node B
6b
Node B
6a

FIG. 6

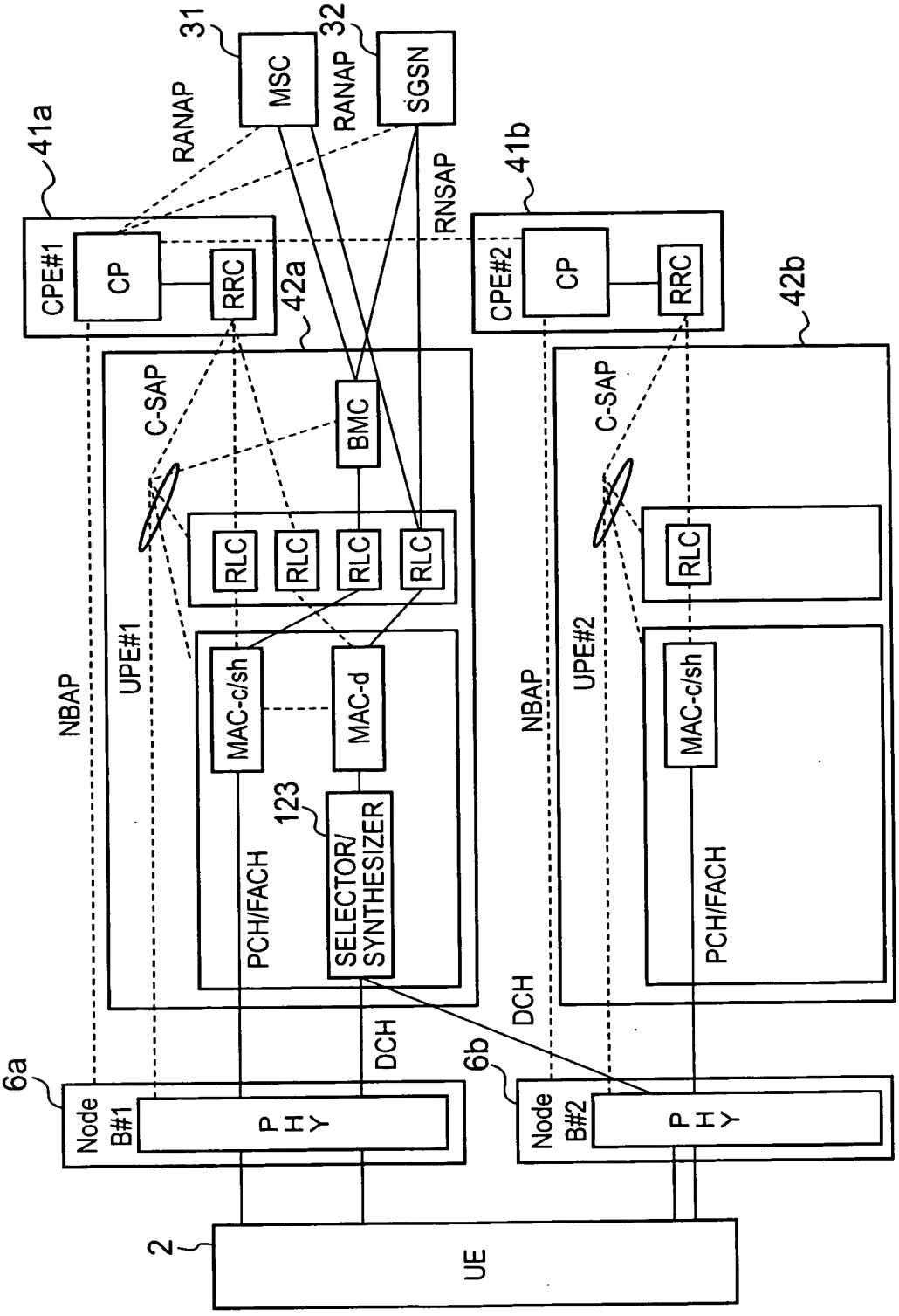

31
MSC
32
SGSN
RANAP
RANAP
RNSAP
41a
41b
CPE#1
CP
RRC
CPE#2
CP
RRC
42a
42b
C-SAP
C-SAP
BMC
RLC
RLC
RLC
RLC
RLC
NBAP
NBAP
UPE#1
UPE#2
MAC-c/sh
MAC-d
MAC-c/sh
123
SELECTOR/
SYNTHESIZER
PCH/FACH
PCH/FACH
DCH
DCH
6a
6b
Node
B#1
Node
B#2
P
H
Y
P
H
Y
2
UE

FIG. 7

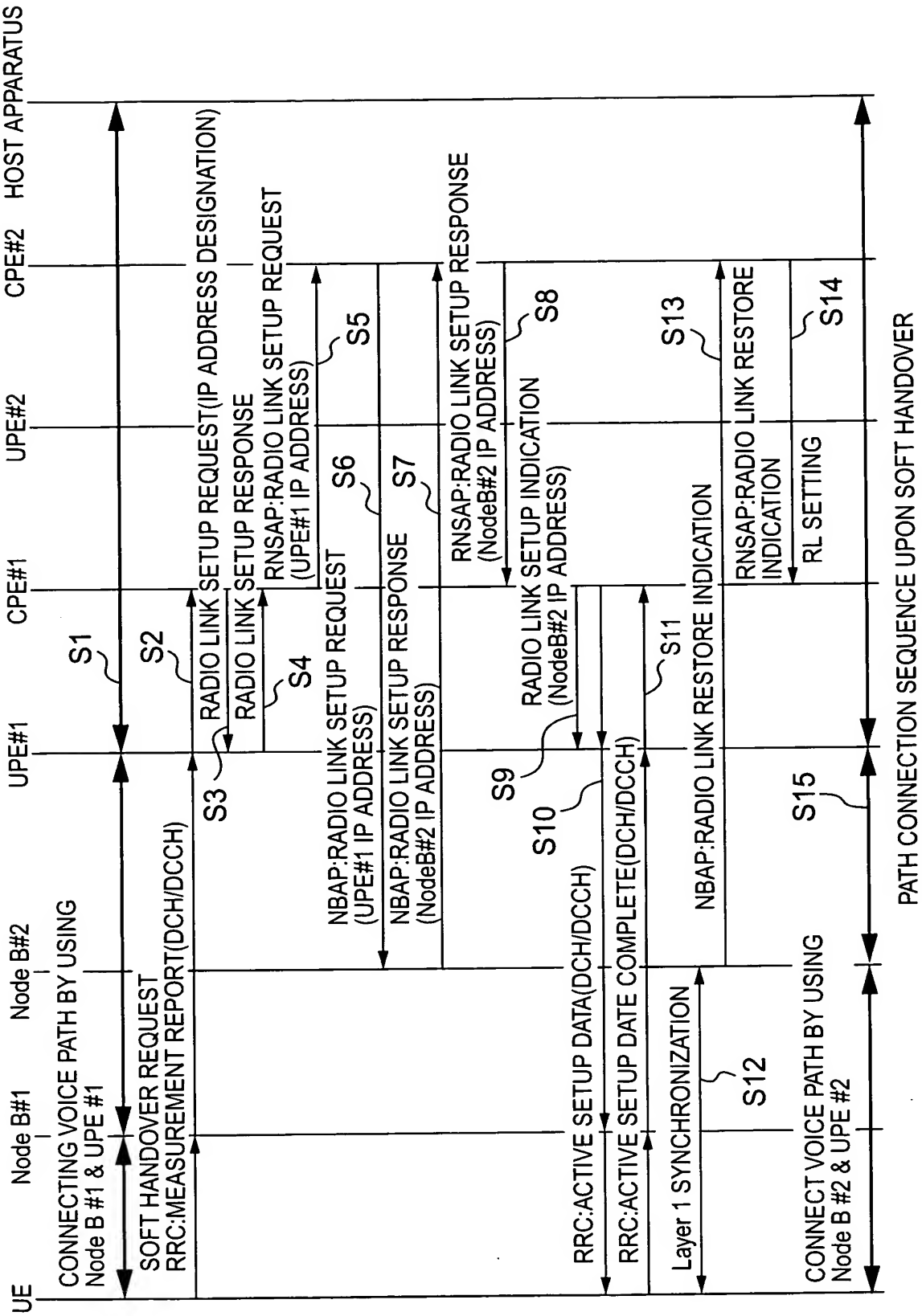
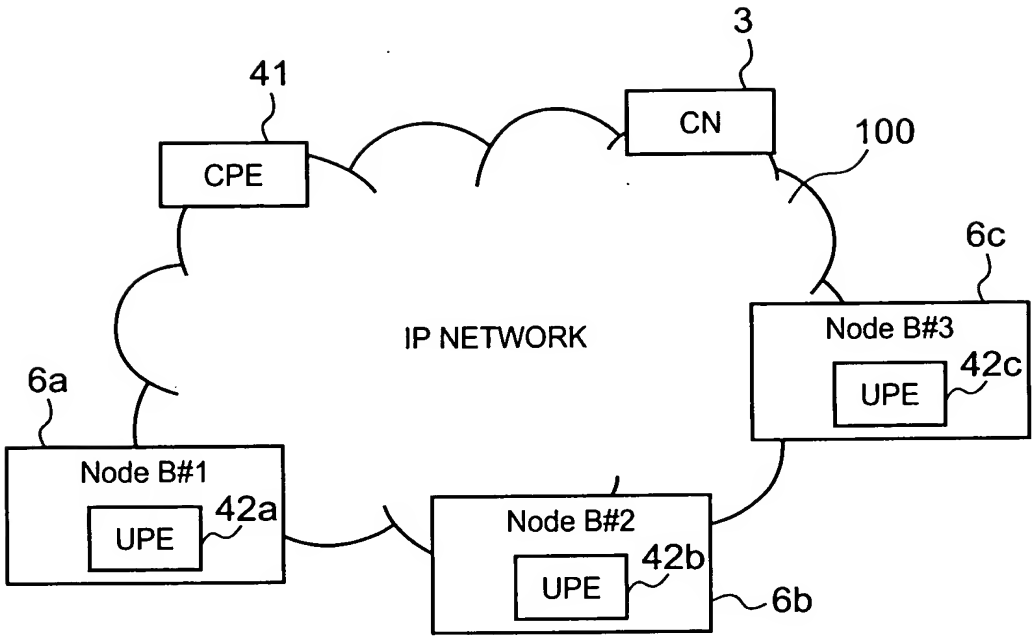

UE
Node B#1
Node B#2
UPE#1
CPE#1
UPE#2
CPE#2
HOST APPARATUS
CONNECTING VOICE PATH BY USING Node B #1 & UPE #1
SOFT HANDOVER REQUEST
RRC:MEASUREMENT REPORT(DCH/DCCH)
S1
S2
RADIO LINK SETUP REQUEST(IP ADDRESS DESIGNATION)
RADIO LINK SETUP RESPONSE
S3
S4
RNSAP:RADIO LINK SETUP REQUEST (UPE#1 IP ADDRESS)
S5
NBAP:RADIO LINK SETUP REQUEST (UPE#1 IP ADDRESS)
S6
NBAP:RADIO LINK SETUP RESPONSE (NodeB#2 IP ADDRESS)
S7
RNSAP:RADIO LINK SETUP RESPONSE (NodeB#2 IP ADDRESS)
S8
RADIO LINK SETUP INDICATION (NodeB#2 IP ADDRESS)
S9
S10
RRC:ACTIVE SETUP DATA(DCH/DCCH)
RRC:ACTIVE SETUP DATE COMPLETE(DCH/DCCH)
S11
S12
Layer 1 SYNCHRONIZATION
NBAP:RADIO LINK RESTORE INDICATION
S13
RNSAP:RADIO LINK RESTORE INDICATION
RL SETTING
S14
S15
CONNECT VOICE PATH BY USING Node B #2 & UPE #2
PATH CONNECTION SEQUENCE UPON SOFT HANDOVER

FIG. 8



NETWORK CONFIGURATION OF IP NETWORK

FIG. 9

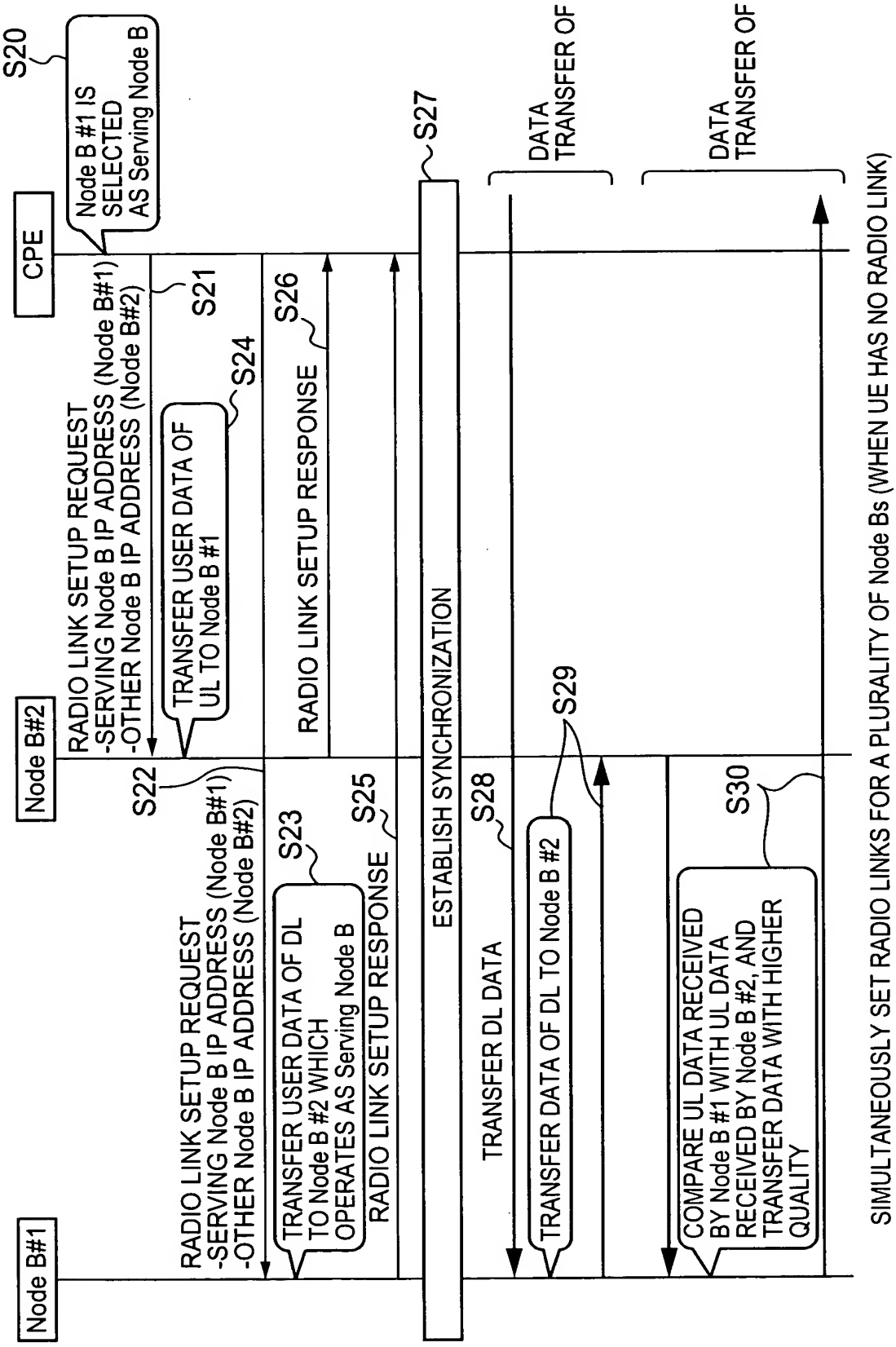

Node B#1
Node B#2
CPE
S20
Node B #1 IS SELECTED AS Serving Node B
RADIO LINK SETUP REQUEST -SERVING Node B IP ADDRESS (Node B#1) -OTHER Node B IP ADDRESS (Node B#2)
S21
TRANSFER USER DATA OF UL TO Node B #1
S24
RADIO LINK SETUP RESPONSE
S26
S27
DATA TRANSFER OF DL
DATA TRANSFER OF UL
S22
RADIO LINK SETUP REQUEST -SERVING Node B IP ADDRESS (Node B#1) -OTHER Node B IP ADDRESS (Node B#2)
S23
TRANSFER USER DATA OF DL TO Node B #2 WHICH OPERATES AS Serving Node B
S25
RADIO LINK SETUP RESPONSE
ESTABLISH SYNCHRONIZATION
S28
TRANSFER DL DATA
S29
TRANSFER DATA OF DL TO Node B #2
S30
COMPARE UL DATA RECEIVED BY Node B #1 WITH UL DATA RECEIVED BY Node B #2, AND TRANSFER DATA WITH HIGHER QUALITY
SIMULTANEOUSLY SET RADIO LINKS FOR A PLURALITY OF Node Bs (WHEN UE HAS NO RADIO LINK)

FIG. 10

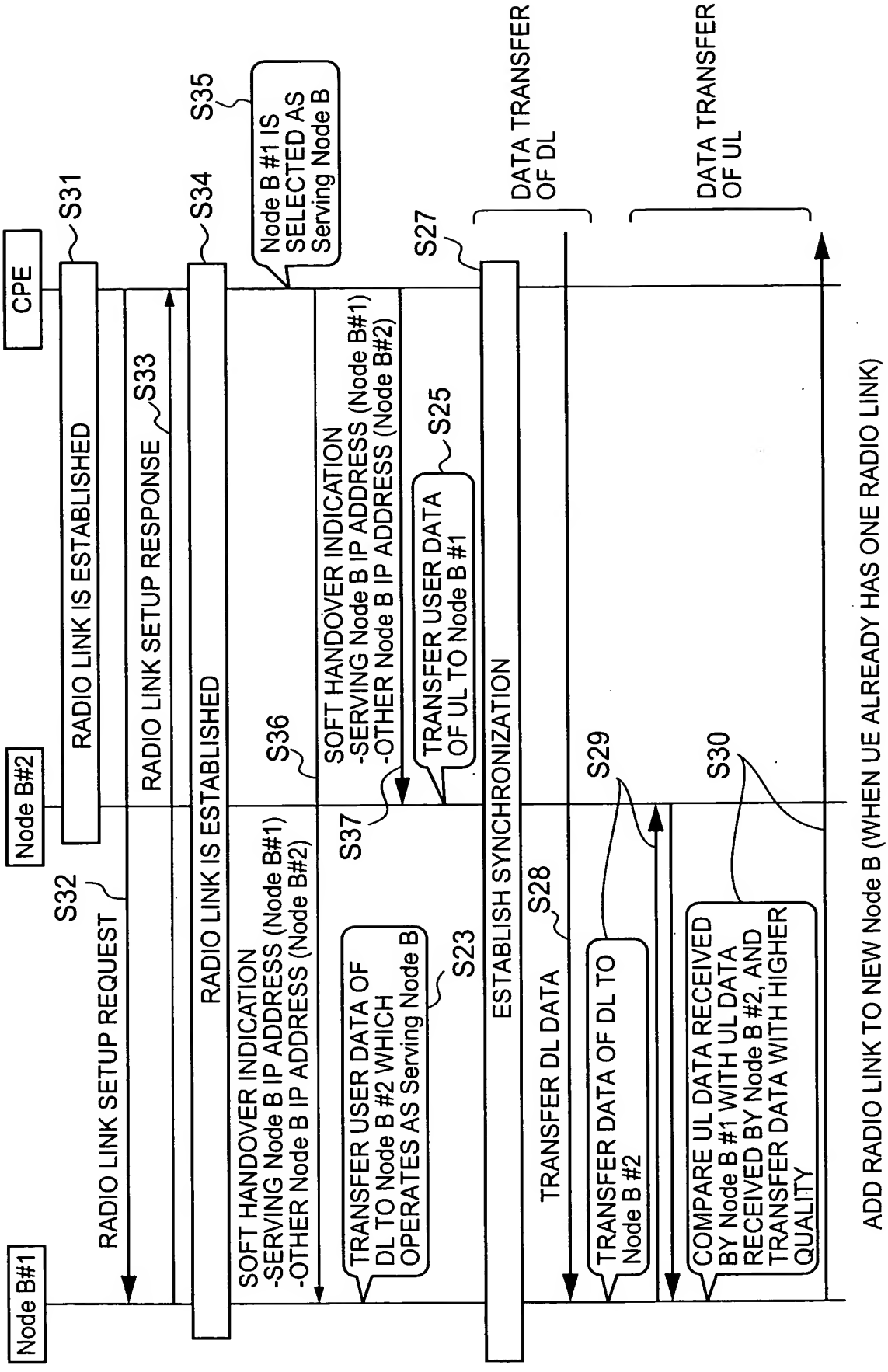

CPE
Node B#2
Node B#1
S31
RADIO LINK IS ESTABLISHED
S32
RADIO LINK SETUP REQUEST
S33
RADIO LINK SETUP RESPONSE
S34
RADIO LINK IS ESTABLISHED
S35
Node B #1 IS SELECTED AS Serving Node B
S36
SOFT HANDOVER INDICATION
-SERVING Node B IP ADDRESS (Node B#1)
-OTHER Node B IP ADDRESS (Node B#2)
S37
SOFT HANDOVER INDICATION
-SERVING Node B IP ADDRESS (Node B#1)
-OTHER Node B IP ADDRESS (Node B#2)
S23
TRANSFER USER DATA OF DL TO Node B #2 WHICH OPERATES AS Serving Node B
S25
TRANSFER USER DATA OF UL TO Node B #1
S27
ESTABLISH SYNCHRONIZATION
S28
TRANSFER DL DATA
S29
TRANSFER DATA OF DL TO Node B #2
S30
COMPARE UL DATA RECEIVED BY Node B #1 WITH UL DATA RECEIVED BY Node B #2, AND TRANSFER DATA WITH HIGHER QUALITY
DATA TRANSFER OF DL
DATA TRANSFER OF UL
ADD RADIO LINK TO NEW Node B (WHEN UE ALREADY HAS ONE RADIO LINK)

FIG. 11

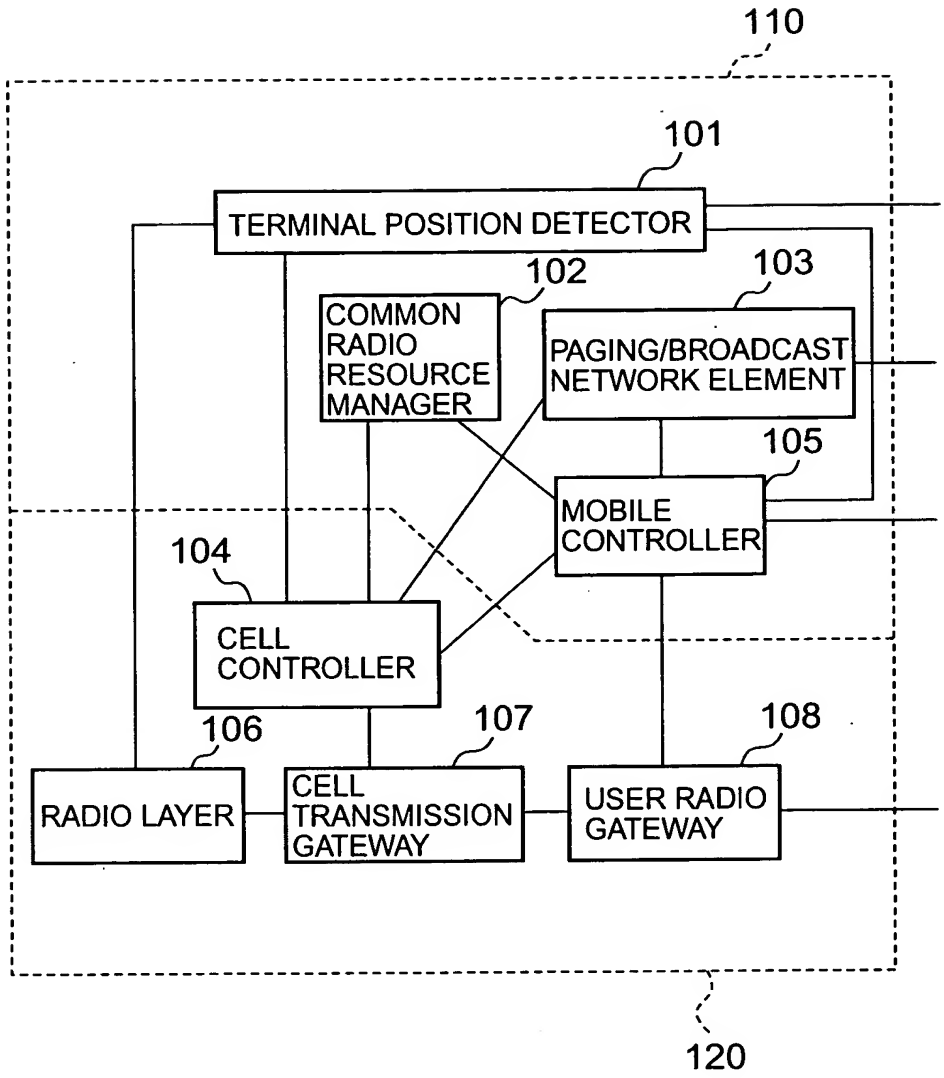

110
101
TERMINAL POSITION DETECTOR
102
COMMON RADIO RESOURCE MANAGER
103
PAGING/BROADCAST NETWORK ELEMENT
105
MOBILE CONTROLLER
104
CELL CONTROLLER
106
RADIO LAYER
107
CELL TRANSMISSION GATEWAY
108
USER RADIO GATEWAY
120

FIG. 12

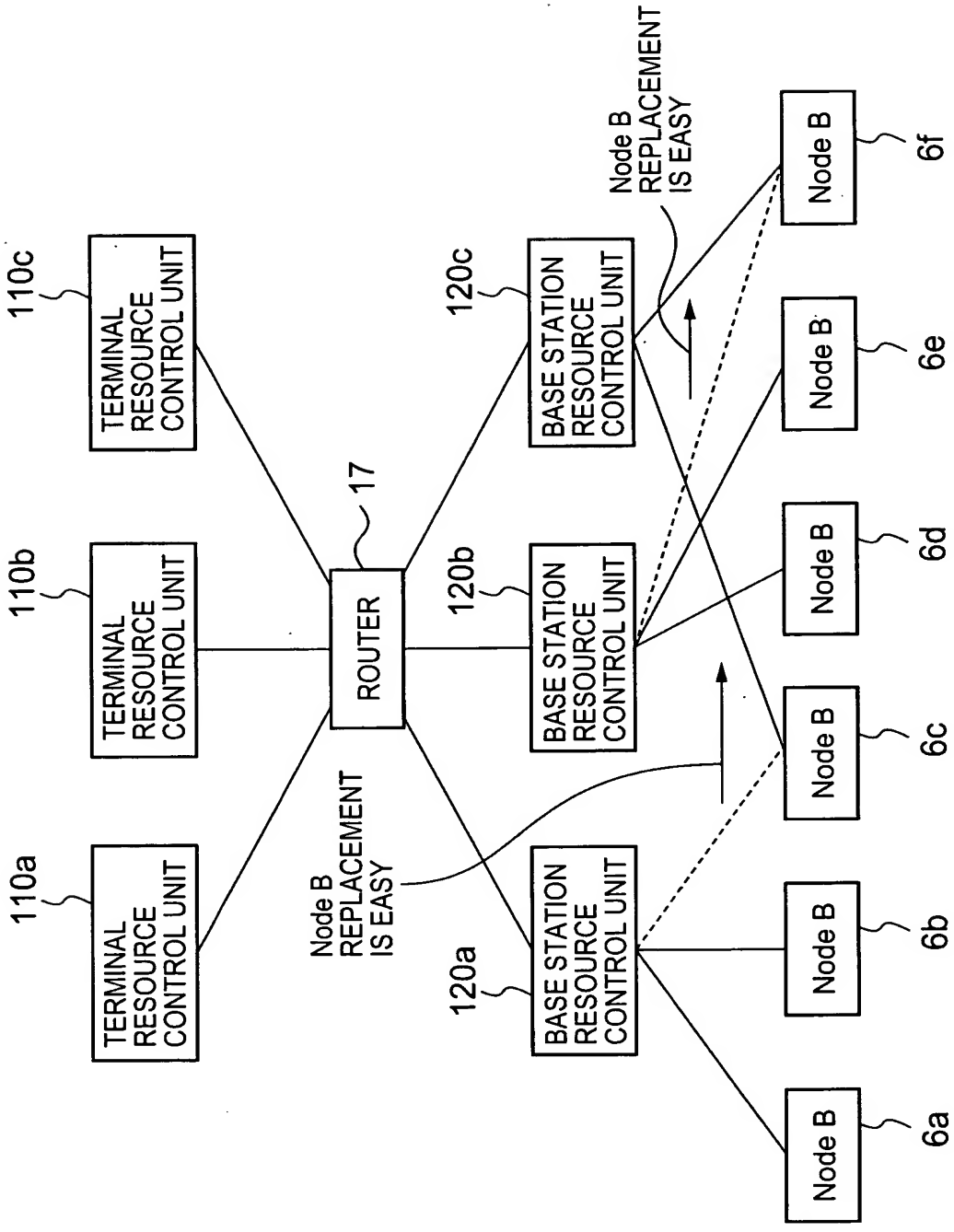

110a
110b
110c
TERMINAL RESOURCE CONTROL UNIT
TERMINAL RESOURCE CONTROL UNIT
TERMINAL RESOURCE CONTROL UNIT
ROUTER
17
120a
120b
120c
BASE STATION RESOURCE CONTROL UNIT
BASE STATION RESOURCE CONTROL UNIT
BASE STATION RESOURCE CONTROL UNIT
Node B REPLACEMENT IS EASY
Node B REPLACEMENT IS EASY
Node B
Node B
Node B
Node B
Node B
Node B
6a
6b
6c
6d
6e
6f

FIG. 13

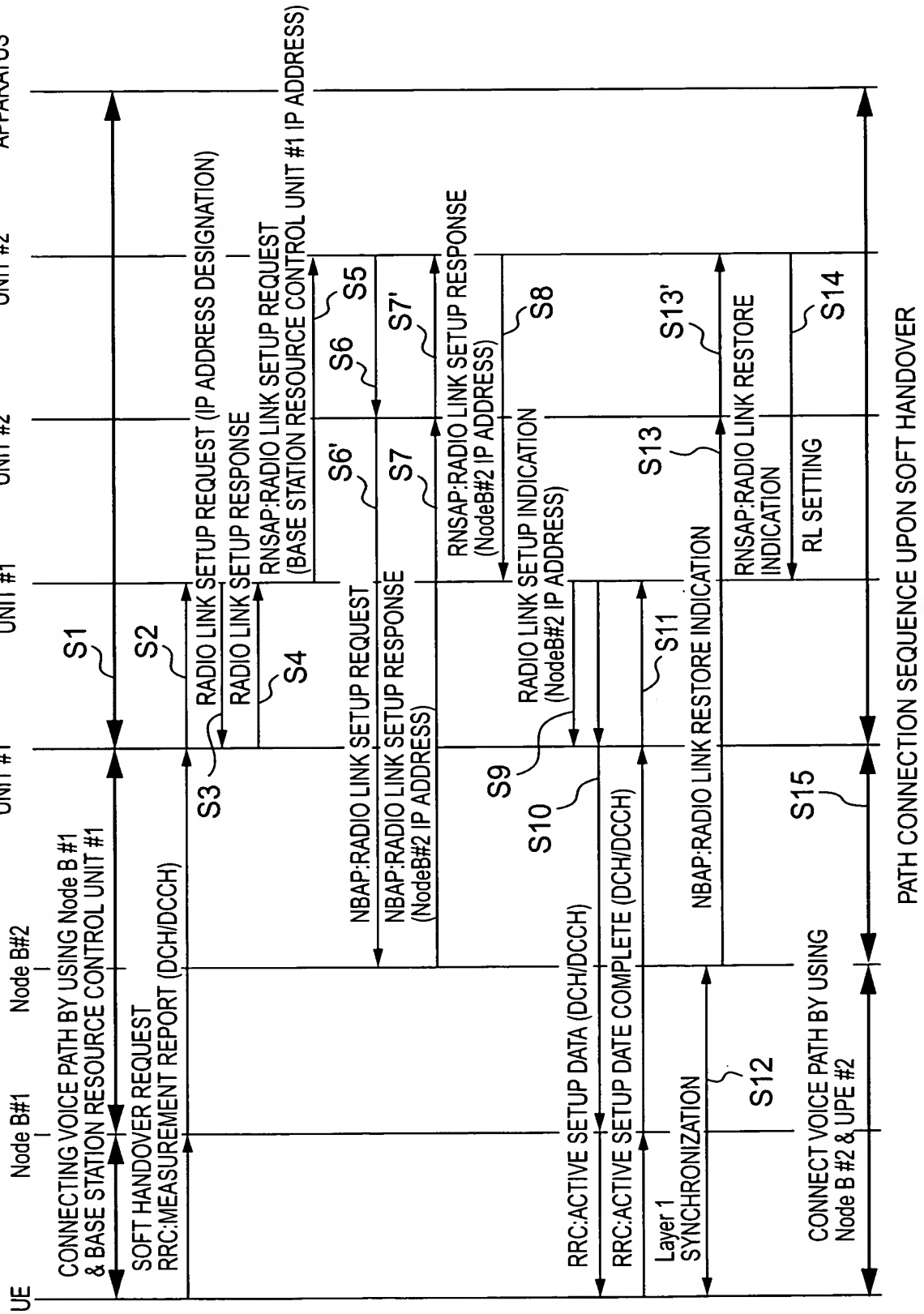

UE
Node B#1
Node B#2
BASE STATION RESOURCE CONTROL UNIT #1
TERMINAL RESOURCE CONTROL UNIT #1
BASE STATION RESOURCE CONTROL UNIT #2
TERMINAL RESOURCE CONTROL UNIT #2
HOST APPARATUS
CONNECTING VOICE PATH BY USING Node B #1 & BASE STATION RESOURCE CONTROL UNIT #1
SOFT HANDOVER REQUEST
RRC:MEASUREMENT REPORT (DCH/DCCH)
RADIO LINK SETUP REQUEST (IP ADDRESS DESIGNATION)
RADIO LINK SETUP RESPONSE
RNSAP:RADIO LINK SETUP REQUEST (BASE STATION RESOURCE CONTROL UNIT #1 IP ADDRESS)
NBAP:RADIO LINK SETUP REQUEST
NBAP:RADIO LINK SETUP RESPONSE (NodeB#2 IP ADDRESS)
RNSAP:RADIO LINK SETUP RESPONSE (NodeB#2 IP ADDRESS)
RADIO LINK SETUP INDICATION (NodeB#2 IP ADDRESS)
RRC:ACTIVE SETUP DATA (DCH/DCCH)
RRC:ACTIVE SETUP DATE COMPLETE (DCH/DCCH)
NBAP:RADIO LINK RESTORE INDICATION
RNSAP:RADIO LINK RESTORE INDICATION
RL SETTING
Layer 1 SYNCHRONIZATION
CONNECT VOICE PATH BY USING Node B #2 & UPE #2
PATH CONNECTION SEQUENCE UPON SOFT HANDOVER
S1
S2
S3
S4
S5
S6
S6'
S7
S7'
S8
S9
S10
S11
S12
S13
S13'
S14
S15

FIG. 14

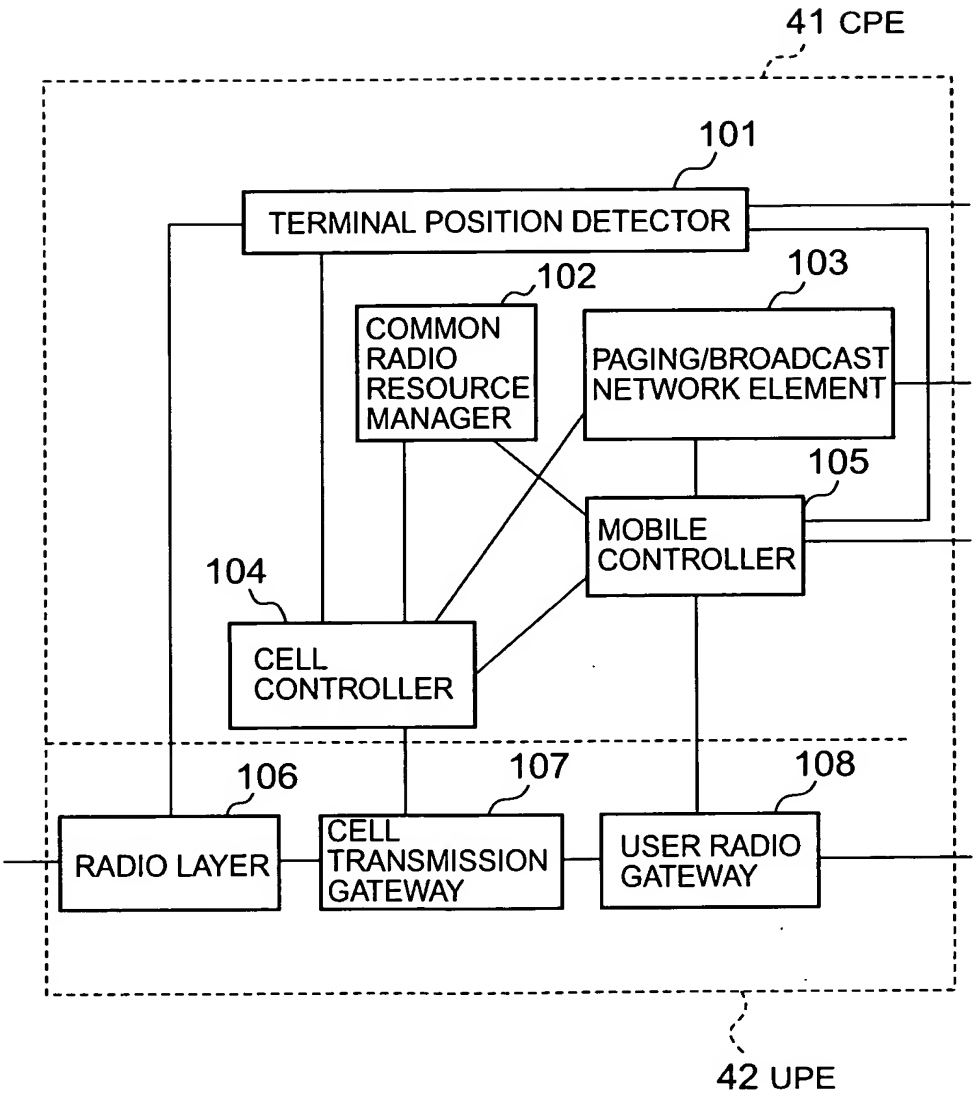

41 CPE
101
TERMINAL POSITION DETECTOR
102
COMMON RADIO RESOURCE MANAGER
103
PAGING/BROADCAST NETWORK ELEMENT
105
MOBILE CONTROLLER
104
CELL CONTROLLER
106
RADIO LAYER
107
CELL TRANSMISSION GATEWAY
108
USER RADIO GATEWAY
42 UPE

FIG. 15

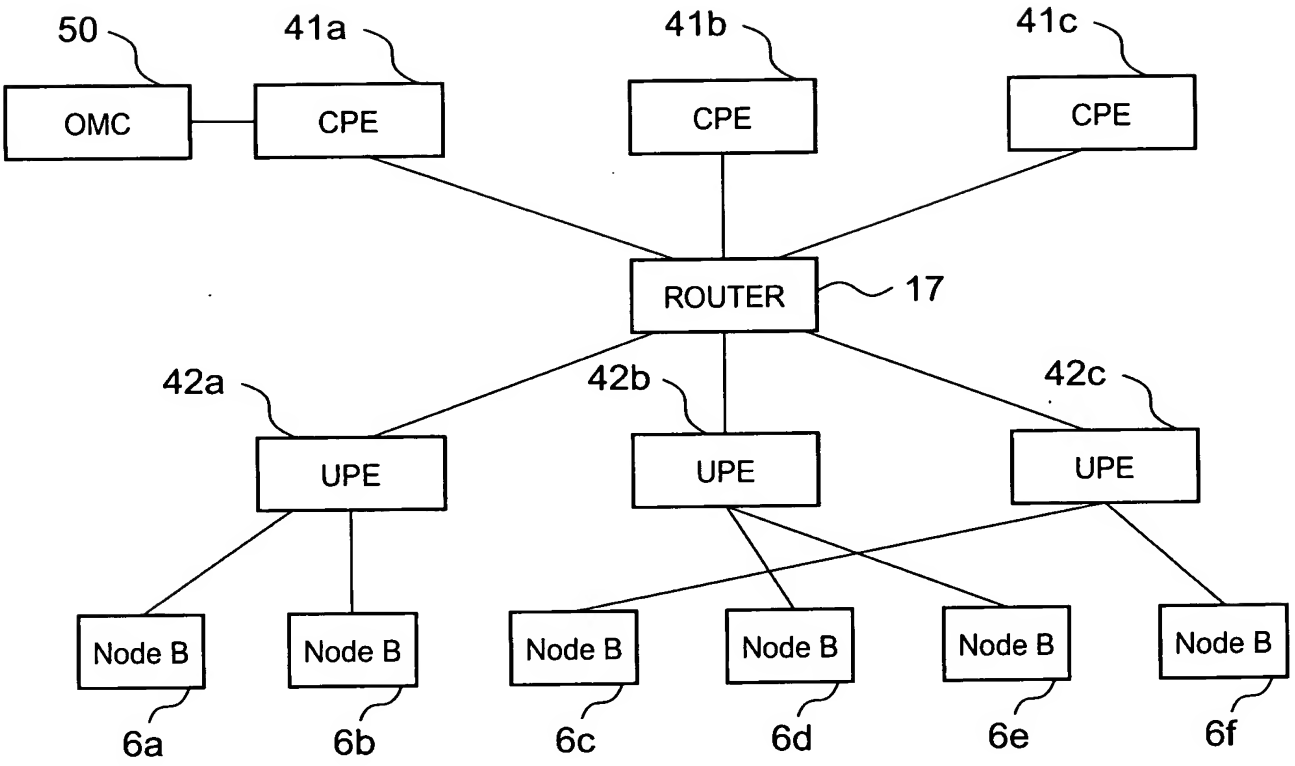

50
41a
41b
41c
OMC
CPE
CPE
CPE
ROUTER
17
42a
42b
42c
UPE
UPE
UPE
Node B
Node B
Node B
Node B
Node B
Node B
6a
6b
6c
6d
6e
6f

FIG. 16

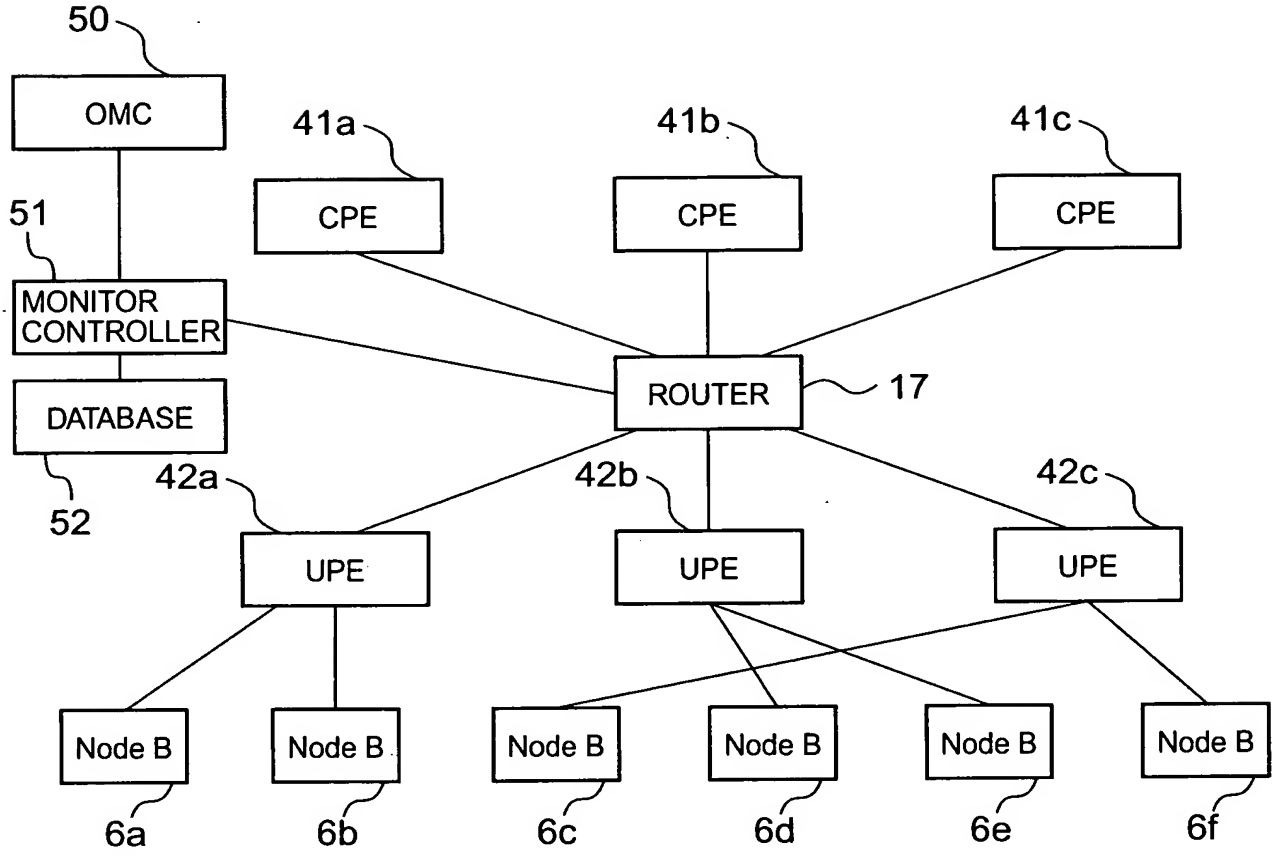

50
OMC
41a
CPE
41b
CPE
41c
CPE
51
MONITOR CONTROLLER
DATABASE
52
ROUTER
17
42a
42b
42c
UPE
UPE
UPE
Node B
Node B
Node B
Node B
Node B
Node B
6a
6b
6c
6d
6e
6f

FIG. 17

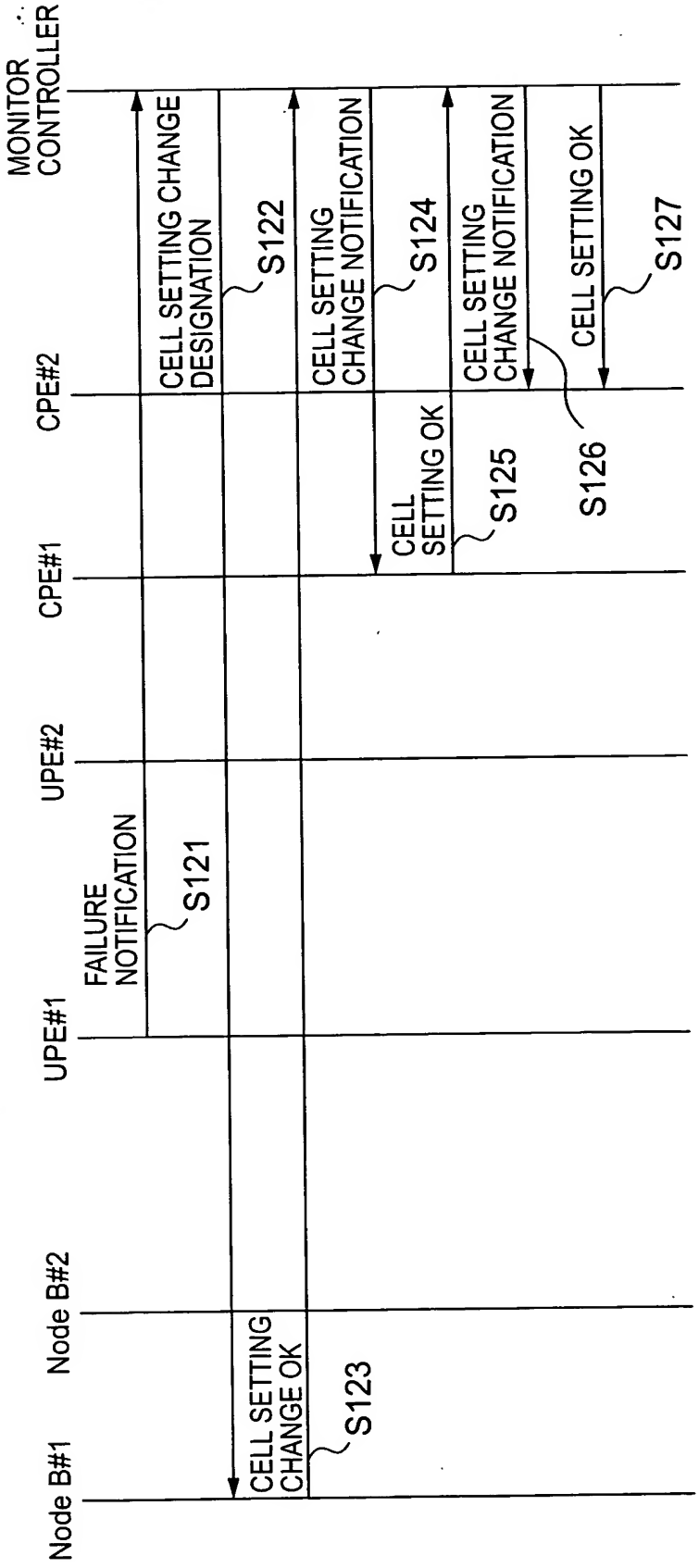

MONITOR CONTROLLER
CPE#2
CPE#1
UPE#2
UPE#1
Node B#2
Node B#1
FAILURE NOTIFICATION
S121
CELL SETTING CHANGE DESIGNATION
S122
CELL SETTING CHANGE OK
S123
CELL SETTING CHANGE NOTIFICATION
S124
CELL SETTING OK
S125
CELL SETTING CHANGE NOTIFICATION
S126
CELL SETTING OK
S127

FIG. 18

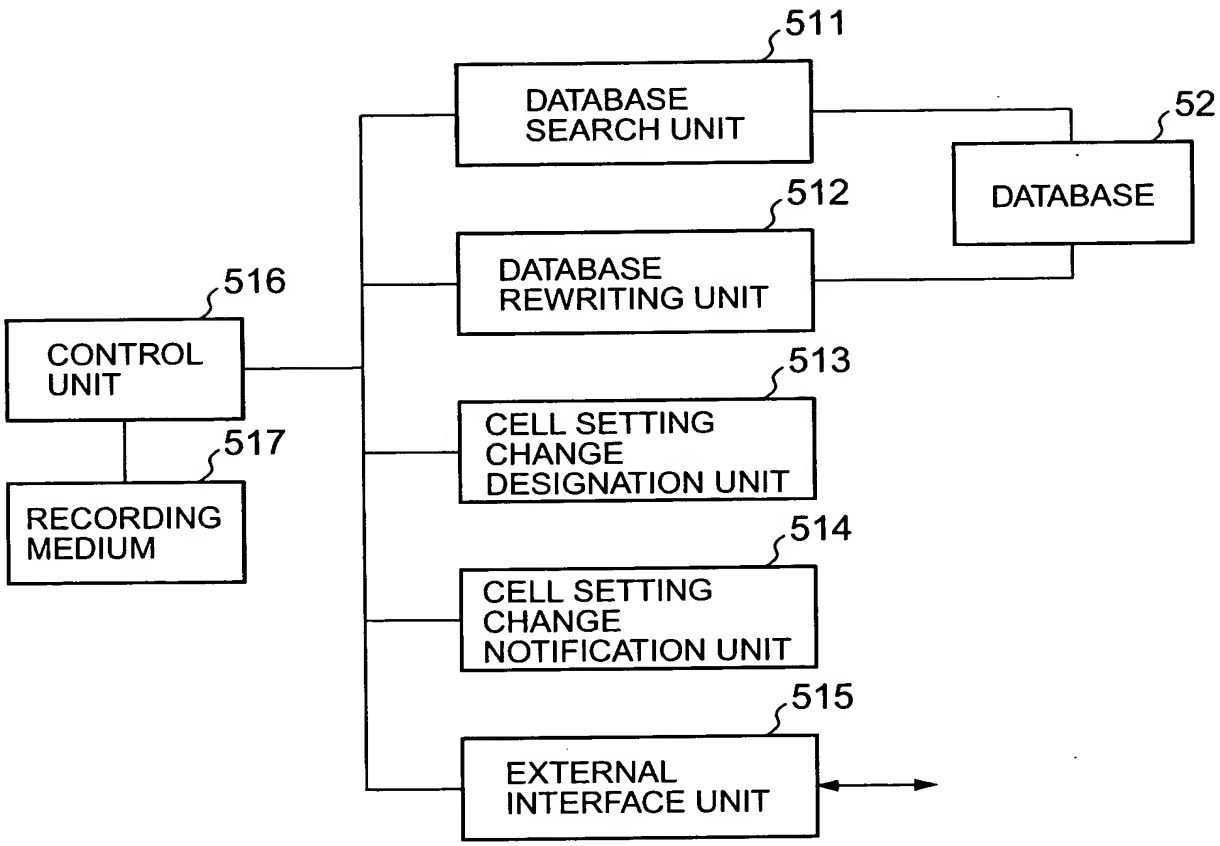

511
DATABASE SEARCH UNIT
52
DATABASE
512
DATABASE REWRITING UNIT
516
CONTROL UNIT
513
CELL SETTING CHANGE DESIGNATION UNIT
517
RECORDING MEDIUM
514
CELL SETTING CHANGE NOTIFICATION UNIT
515
EXTERNAL INTERFACE UNIT

FIG. 19

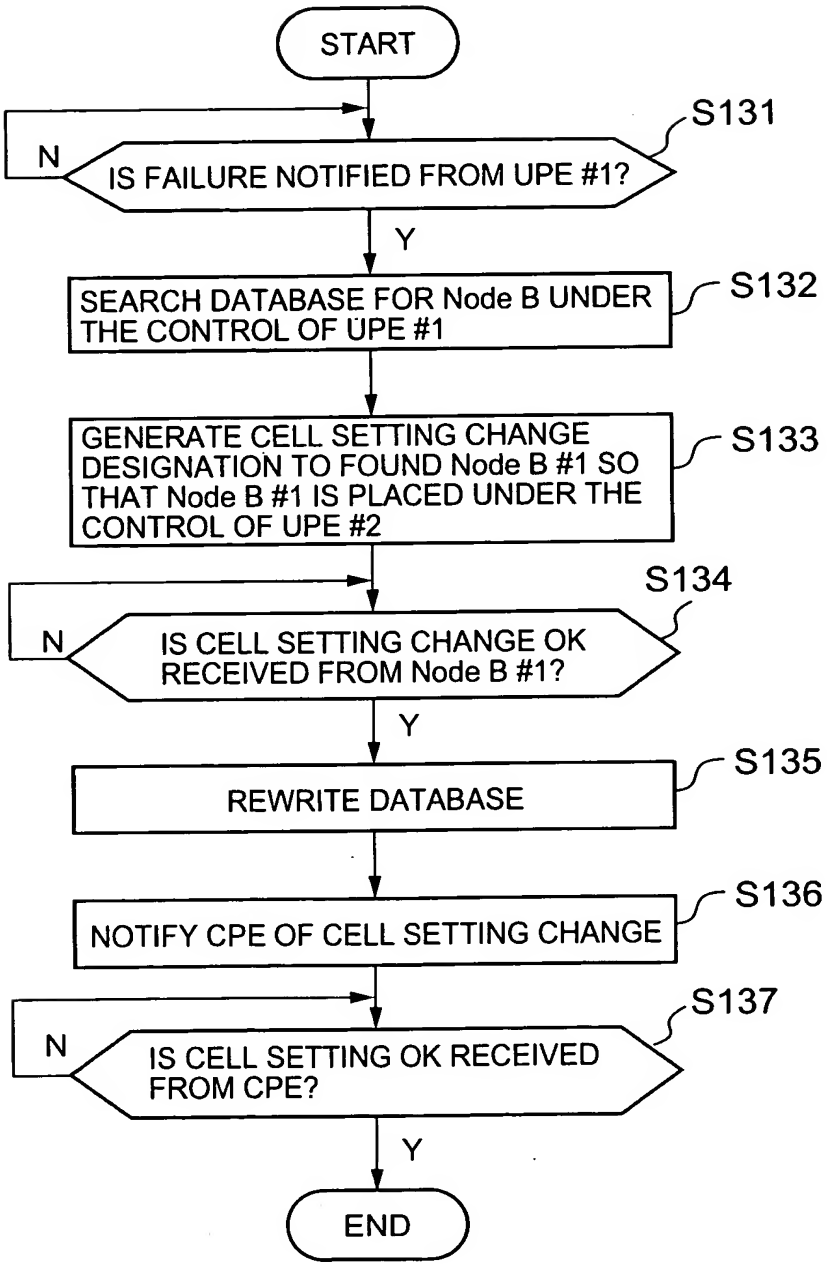

START
S131
N
IS FAILURE NOTIFIED FROM UPE #1?
Y
SEARCH DATABASE FOR Node B UNDER THE CONTROL OF UPE #1
S132
GENERATE CELL SETTING CHANGE DESIGNATION TO FOUND Node B #1 SO THAT Node B #1 IS PLACED UNDER THE CONTROL OF UPE #2
S133
S134
N
IS CELL SETTING CHANGE OK RECEIVED FROM Node B #1?
Y
REWRITE DATABASE
S135
NOTIFY CPE OF CELL SETTING CHANGE
S136
S137
N
IS CELL SETTING OK RECEIVED FROM CPE?
Y
END

FIG. 20

UPE	NodeB	CELL
UPE#1	NodeB#1	CELL#1
UPE#2	NodeB#2	CELL#2

UPE	NodeB	CELL
UPE#1	-	-
UPE#2	NodeB#1	CELL#1
	NodeB#2	CELL#2

FIG. 21

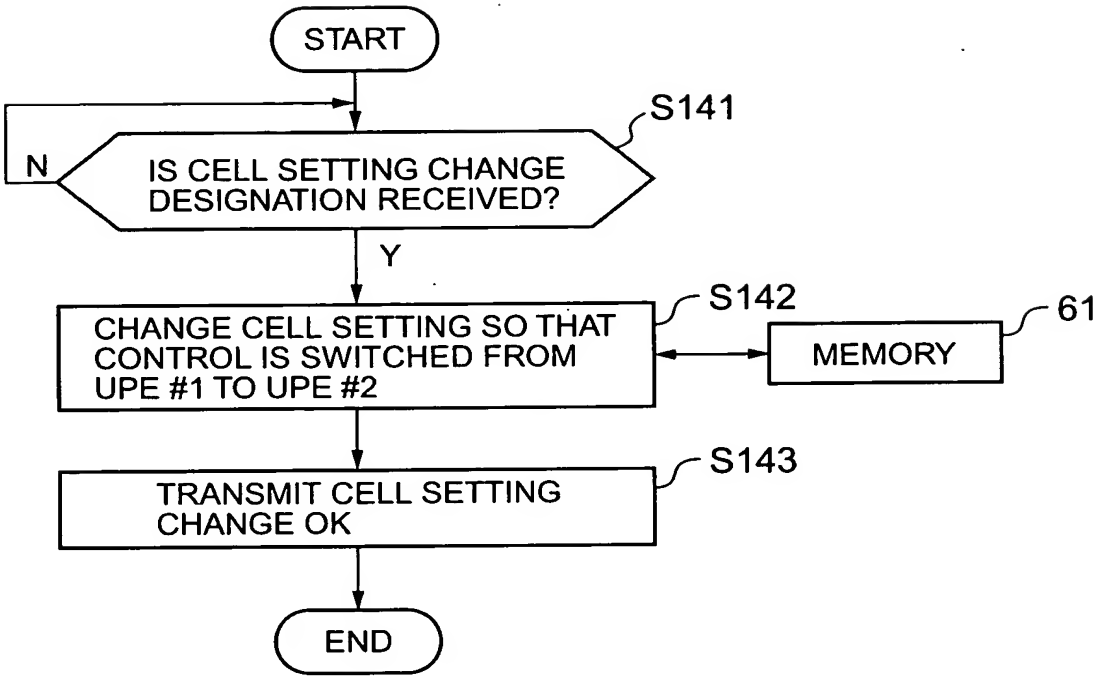

START
S141
N
IS CELL SETTING CHANGE DESIGNATION RECEIVED?
Y
S142
CHANGE CELL SETTING SO THAT CONTROL IS SWITCHED FROM UPE #1 TO UPE #2
MEMORY
61
S143
TRANSMIT CELL SETTING CHANGE OK
END

FIG. 22

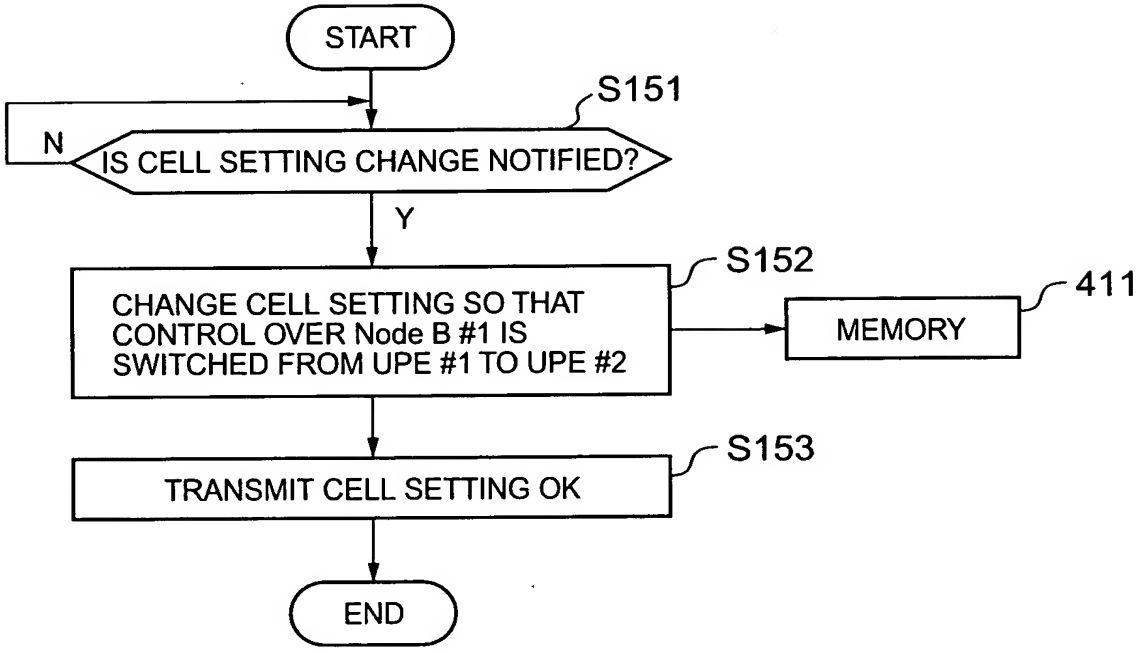

START
S151
N
IS CELL SETTING CHANGE NOTIFIED?
Y
S152
CHANGE CELL SETTING SO THAT CONTROL OVER Node B #1 IS SWITCHED FROM UPE #1 TO UPE #2
MEMORY
411
S153
TRANSMIT CELL SETTING OK
END

FIG. 23

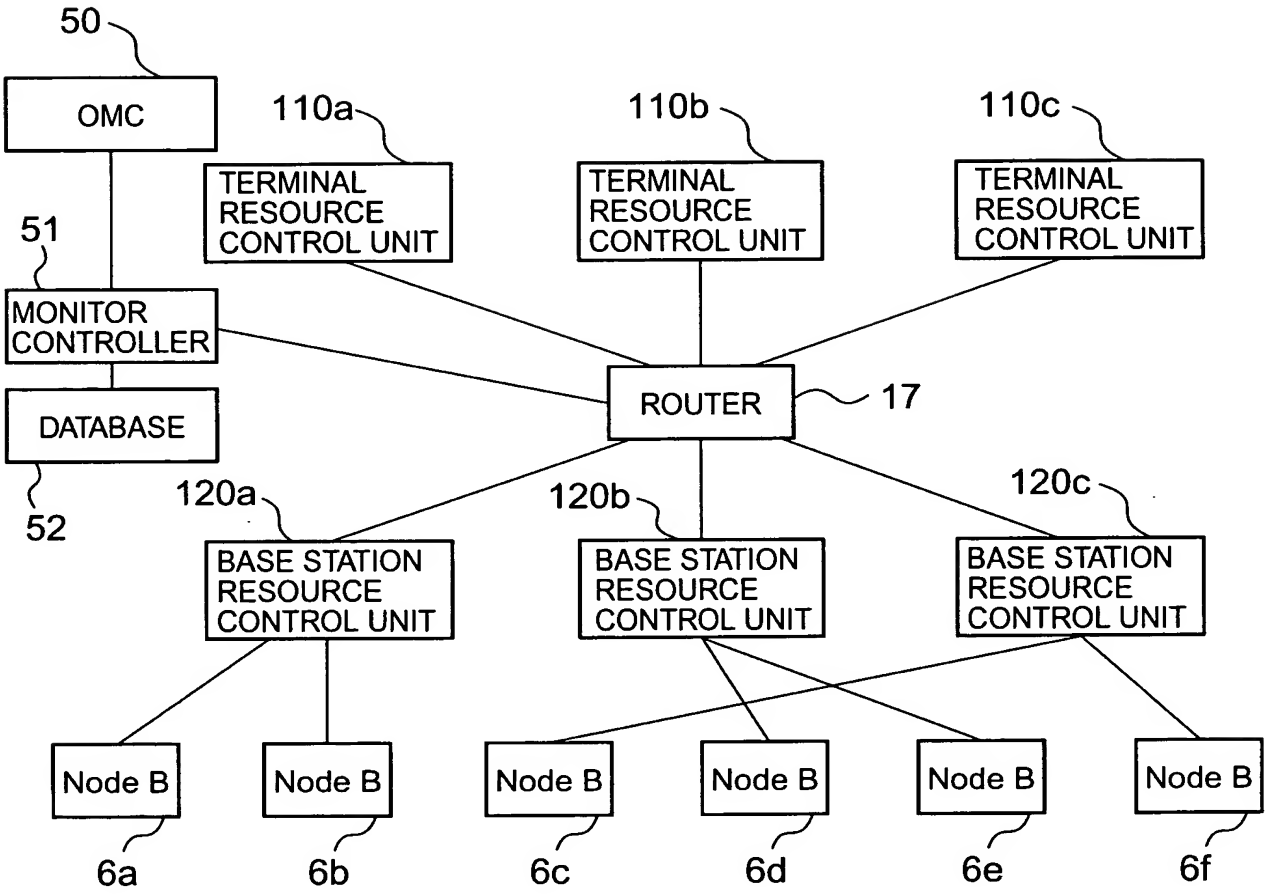

50
OMC
110a
TERMINAL RESOURCE CONTROL UNIT
110b
TERMINAL RESOURCE CONTROL UNIT
110c
TERMINAL RESOURCE CONTROL UNIT
51
MONITOR CONTROLLER
DATABASE
52
ROUTER
17
120a
BASE STATION RESOURCE CONTROL UNIT
120b
BASE STATION RESOURCE CONTROL UNIT
120c
BASE STATION RESOURCE CONTROL UNIT
Node B
6a
Node B
6b
Node B
6c
Node B
6d
Node B
6e
Node B
6f

FIG. 24

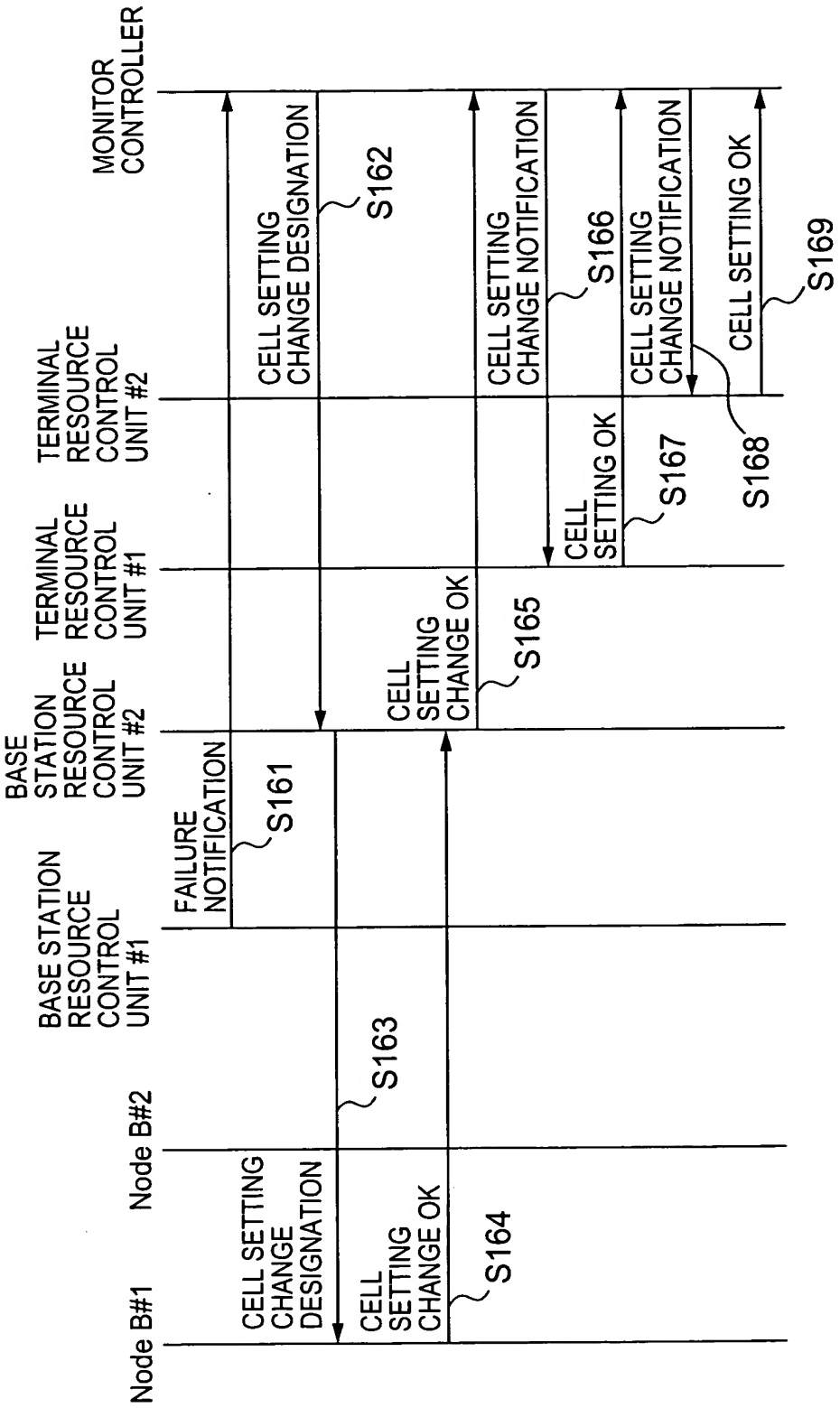

Node B#1
Node B#2
BASE STATION RESOURCE CONTROL UNIT #1
BASE STATION RESOURCE CONTROL UNIT #2
TERMINAL RESOURCE CONTROL UNIT #1
TERMINAL RESOURCE CONTROL UNIT #2
MONITOR CONTROLLER
FAILURE NOTIFICATION
S161
CELL SETTING CHANGE DESIGNATION
S162
CELL SETTING CHANGE DESIGNATION
S163
CELL SETTING CHANGE OK
S164
CELL SETTING CHANGE OK
S165
CELL SETTING CHANGE NOTIFICATION
S166
CELL SETTING OK
S167
CELL SETTING CHANGE NOTIFICATION
S168
CELL SETTING OK
S169

FIG. 25

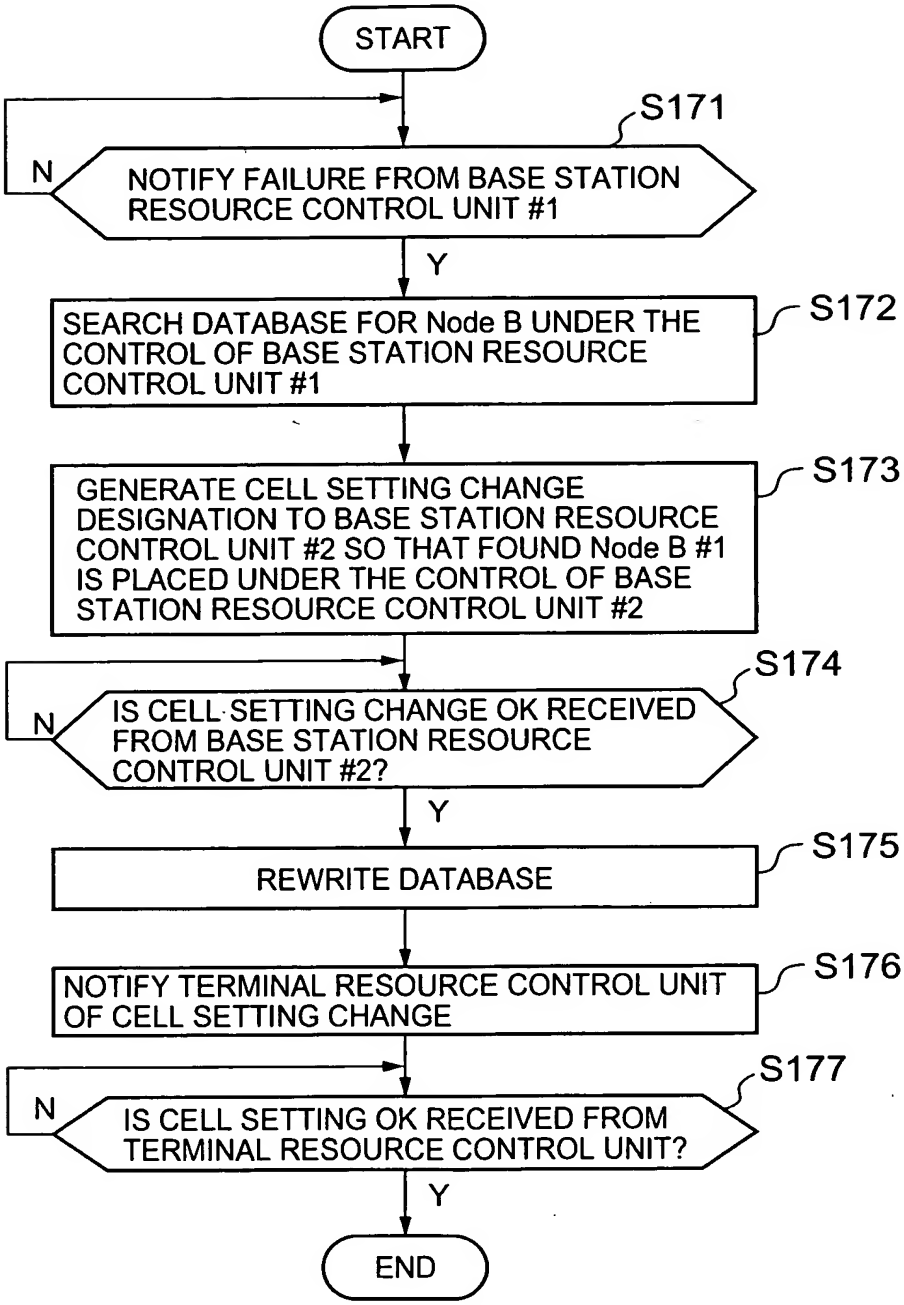
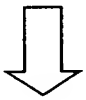

START
S171
N
NOTIFY FAILURE FROM BASE STATION RESOURCE CONTROL UNIT #1
Y
SEARCH DATABASE FOR Node B UNDER THE CONTROL OF BASE STATION RESOURCE CONTROL UNIT #1
S172
GENERATE CELL SETTING CHANGE DESIGNATION TO BASE STATION RESOURCE CONTROL UNIT #2 SO THAT FOUND Node B #1 IS PLACED UNDER THE CONTROL OF BASE STATION RESOURCE CONTROL UNIT #2
S173
S174
N
IS CELL SETTING CHANGE OK RECEIVED FROM BASE STATION RESOURCE CONTROL UNIT #2?
Y
REWRITE DATABASE
S175
NOTIFY TERMINAL RESOURCE CONTROL UNIT OF CELL SETTING CHANGE
S176
S177
N
IS CELL SETTING OK RECEIVED FROM TERMINAL RESOURCE CONTROL UNIT?
Y
END

FIG. 26

BASE STATION RESOURCE CONTROL UNIT	NodeB	CELL
BASE STATION RESOURCE CONTROL UNIT#1	NodeB#1	CELL#1
BASE STATION RESOURCE CONTROL UNIT#2	NodeB#2	CELL#2



BASE STATION RESOURCE CONTROL UNIT	NodeB	CELL
BASE STATION RESOURCE CONTROL UNIT#1	–	–
BASE STATION RESOURCE CONTROL UNIT#2	NodeB#1	CELL#1
	NodeB#2	CELL#2

FIG. 27

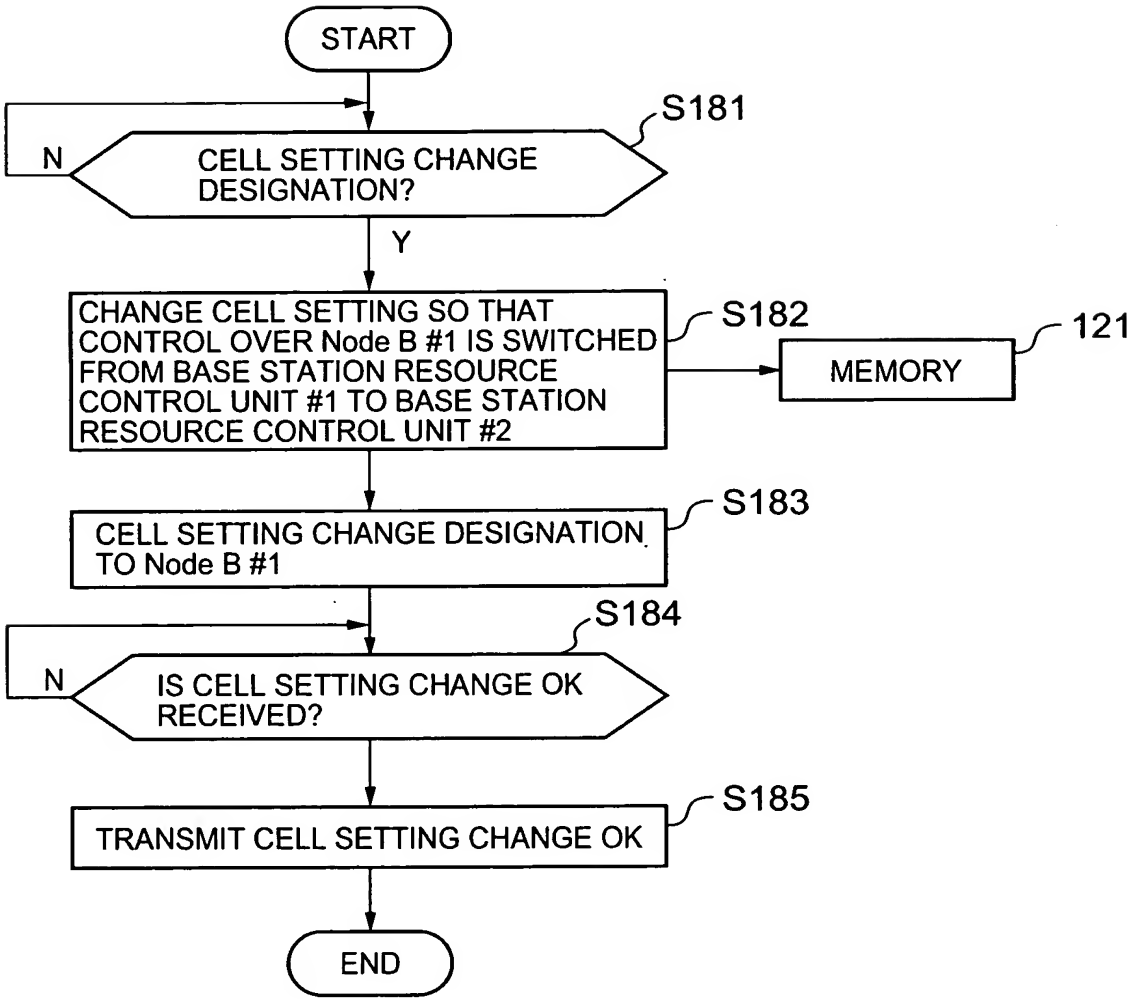
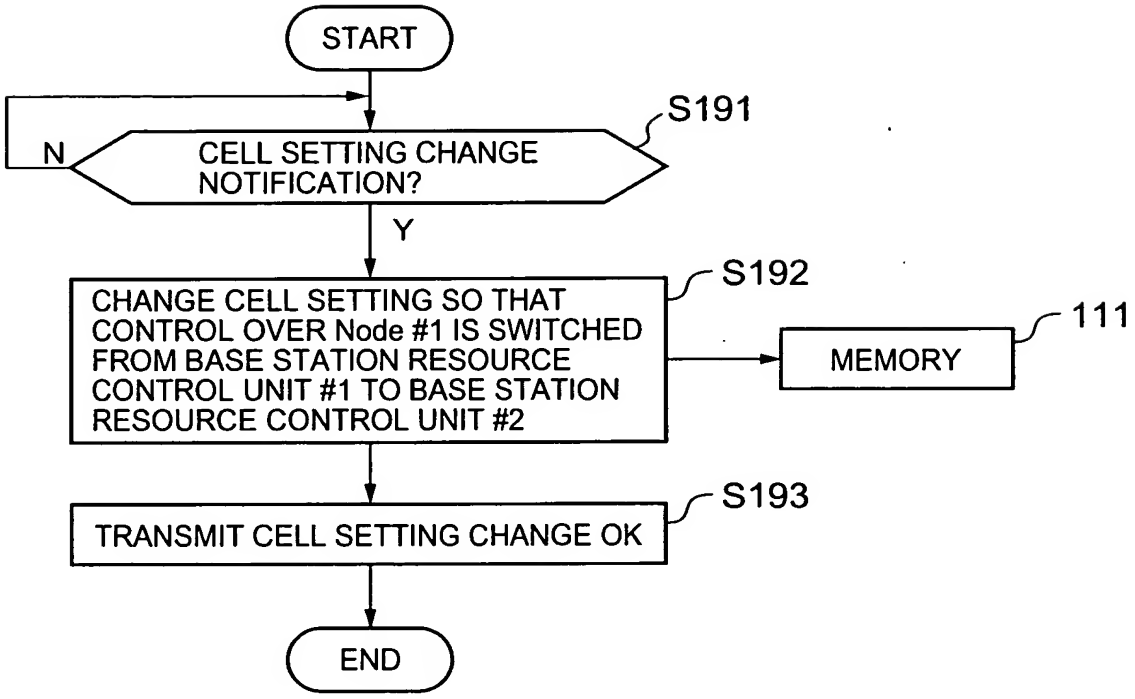

START
S181
N
CELL SETTING CHANGE DESIGNATION?
Y
CHANGE CELL SETTING SO THAT CONTROL OVER Node B #1 IS SWITCHED FROM BASE STATION RESOURCE CONTROL UNIT #1 TO BASE STATION RESOURCE CONTROL UNIT #2
S182
MEMORY
121
CELL SETTING CHANGE DESIGNATION TO Node B #1
S183
S184
N
IS CELL SETTING CHANGE OK RECEIVED?
TRANSMIT CELL SETTING CHANGE OK
S185
END

FIG. 28


START
S191
N
CELL SETTING CHANGE NOTIFICATION?
Y
S192
CHANGE CELL SETTING SO THAT CONTROL OVER Node #1 IS SWITCHED FROM BASE STATION RESOURCE CONTROL UNIT #1 TO BASE STATION RESOURCE CONTROL UNIT #2
MEMORY
111
S193
TRANSMIT CELL SETTING CHANGE OK
END